# National Transportation Safety Board
# Aviation Accident Final Report

| | | | |
|---|---|---|---|
| **Location:** | NEWTON, WI | **Accident Number:** | CHI97FA084A |
| **Date & Time:** | 03/15/1997, 1528 CST | **Registration:** | TZ389 |
| **Aircraft:** | Douglas DC-3C/BT-67R | **Aircraft Damage:** | Destroyed |
| **Defining Event:** | | **Injuries:** | 2 Fatal |
| **Flight Conducted Under:** | Part 91: General Aviation - | | |

## Analysis

At 1400 cst, modified Douglas DC-3C/BT-67R, TZ389, & Beech A36, N3657A, began formation flight to get DC-3 flying time & for the 2nd occupant of the A36 to get aerial photos of the DC-3. A witness saw the airplanes (acft) at 500' to 700' agl, "flying close together heading north." He said "the big plane (DC-3) was flying straight & level. The little plane (A36) was just to the west of the big plane. The little plane then hit the big plane near the middle." After impact, pieces of acft were seen falling. Another witness saw the DC-3 heading north & the A36 circling it above & below. On its last pass, the A36 circled behind the DC-3, then crossed over the top & hitting the top of the DC-3. About 5 seconds after impact, the DC-3 gently rolled/turned westbound (apparently descending & gaining airspeed); the left wing then came off, followed by the right wing about 2 seconds later. Parts of the A36 empennage were found 3590 to 4910 ft from the main wreckage. There was evidence that during impact, the DC-3 elevator and rudder controls were severed. No preimpact anomalies were found. At 1445cst, an AIRMET had been issued, forecasting light to moderate turbulence below 8,000 ft msl. Toxicology tests of the DC-3 copilot's blood showed 0.127 mcg/ml amitriptyline (a prescription antidepressant with sedative side effects), 0.039 mcg/ml nortriptyline (metabolite of amitriptyline), and an undetermined amount of ephedrine and phenylpropanolamine (over-the-counter medications used in cold preparations, diet aids & stimulants).

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: failure of the Beech A36 pilot to maintain clearance from the modified Douglas DC-3, while positioning the A36 for photography of the DC-3.

## Findings

Occurrence #1: MIDAIR COLLISION
Phase of Operation: CRUISE

Findings
1. FORMATION FLYING - INITIATED
2. WEATHER CONDITION - TURBULENCE
3. USE OF INAPPROPRIATE MEDICATION/DRUG - COPILOT/SECOND PILOT
4. (C) CLEARANCE - NOT MAINTAINED - PILOT OF OTHER AIRCRAFT
---

Occurrence #2: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: CRUISE

Findings
5. FLIGHT CONTROL SYSTEM - CUT/SEVERED
6. AIRCRAFT CONTROL - NOT POSSIBLE
7. AIRSPEED - UNCONTROLLED
8. WING - OVERLOAD
---

Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: DESCENT - UNCONTROLLED

## Factual Information

HISTORY OF FLIGHT

On March 15, 1997, at 1528 central standard time (cst), a Douglas DC-3C/BT-67R, TZ389, operated by an airline transport pilot, was destroyed when during cruise formation flight with a Beechcraft A-36, N3657A, the two airplanes collided. Both airplanes subsequently departed controlled flight and impacted the terrain. Visual meteorological conditions prevailed at the time of the accident. The aerial photography flight was being conducted under 14 CFR Part 91. Neither pilot had filed a flight plan. Both pilots on the DC-3C/BT-67R, and the pilot and passenger on the A-36 were fatally injured. The flight originated at Oshkosh, Wisconsin, at 1400 cst.

An employee of Basler Turbo Conversions, Incorporated, Oshkosh, Wisconsin, the company which employed the three pilots and passenger of the two airplanes, stated that when he arrived at the company on the day of the accident, the passenger was already there. The witness said that the first officer arrived at 1015 cst and began a pre-flight inspection of the DC-3C. The pilot-in-command arrived at 1030 cst. The DC-3C was scheduled for two flights that day. The first flight was scheduled to takeoff at 1100 cst. The purpose of the flight was to put some flying hours on the DC-3C. The purpose of the second flight was to fly in formation with the A-36 and allow the passenger on the A-36 to take aerial photographs of the DC-3C. The witness said that the DC-3C took off on its first flight at 1100 cst. He said that the airplane flew for approximately one hour and a half before landing back at Oshkosh, Wisconsin at approximately 1230 cst. The witness said that the DC-3C was scheduled to take off on its second flight at approximately 1400 cst.

At approximately 1525 cst, a witness standing in his yard just off of CTH F road, was talking to a friend when he saw the DC-3C and the A-36 airplanes "flying close together heading north." The witness said they were east of his house and approximately 500 to 700 feet above the ground. The witness said "the big plane [DC-3C] was flying straight and level. The little plane [A-36] was just to the west of the big plane. The little plane then hit the big plane near the middle." The witness said that after the airplanes hit, he saw pieces of the airplanes falling to the ground. "The little plane headed east going down." The big plane headed west.

Another witness was traveling eastbound on a snowmobile trail southwest of Newton, Wisconsin, with his girlfriend and daughter when he saw the two airplanes heading north. He stopped his snowmobile on the trail to show his daughter the airplanes. The witness said that the large airplane (DC-3) was heading north and the small airplane (A-36) was circling it above and below. On its last pass, the small airplane circled behind the large airplane, then it crossed over the top of the large airplane hitting the top of the large airplane. The small airplane continued west after the collision. The large airplane continued north for five seconds then turned westbound in a gentle turn. The left wing then came off while in the turn, followed by the right wing two seconds later. The large airplane then went straight down with the top of the airplane facing west.

Another witness was traveling south on Interstate 43 just north of the Highway C off ramp when he saw an airplane. The witness stated that it was "barrel rolling in different directions on the east side of Interstate 43. At one point it came down straight as an arrow. Then at a point, it leveled off." As the witness exited the interstate he saw "objects and debris falling out of the sky."

At approximately 1530 cst, another witness traveling south on Interstate 43, observed pieces of an airplane falling to the ground very quickly. A few seconds later, she saw a large plane banking and beginning to descend. "At the moment that it turned I could see the entire plane falling perpendicular to the earth. The witness said that she noticed that the airplane was missing its left wing. "The large wing was floating down very slowly." The witness also stated, "A few moments before the plane hit, the nose seemed to come up slightly." The witness then lost sight of the airplane.

PERSONNEL INFORMATION

The captain of the DC-3C had 5,350 hours total flying time, 4,430 hours in multi-engine airplanes, and 3,772 hours of pilot-in- command time in DC-3s. The captain had undergone a biennial flight review in a DC-3, on February 6, 1997.

The first officer of the DC-3C had 1,793 hours total flying time, 693 hours in multi-engine airplanes, and 693 hours in DC-3s. The first officer had undergone a biennial flight review in a DC-3, on November 25, 1996.

The pilot of the A-36 had 28,600 hours total flying time, 8,600 hours in single-engine airplanes, and 2,330 hours in the A-36. The pilot had undergone a biennial flight review in a DC-3, on October 28, 1996.

AIRCRAFT INFORMATION

The DC-3C/BT-67R airplane, serial number 26002, was a turboprop- engine conversion of a Douglas DC-3C military airplane. The original airplane was manufactured by the Douglas Aircraft Company, Incorporated, for the United States Army in 1943. Basler Turbo Conversions, Incorporated, obtained the airplane from the Canadian government in 1991. At the time of the purchase, the airplane was being used by the Royal Canadian Air Force as a transport. The airframe's total time at the time of purchase was 17,606.0 hours.

Basler Turbo Conversions, Incorporated, began conversion work on the airplane, N29BF, in 1993. The Republic of Mali, Ministry of Armed Forces and Veterans placed the purchase order for the airplane on November 17, 1996. The airplane's conversion, covered under several FAA supplemental type certificates (STC), included replacement of the two Pratt and Whitney R-1830 radial- piston engines with Pratt and Whitney PT-6A-67R turboprop engines, addition of five-bladed Hartzell HC-B5MA-3 feathering and reversing propellers, structural strengthening of the center wing section, addition of a 40-inch long plug to the fuselage just forward of the wings from station 155.5 to station 195.5, and addition of long-range outer wing fuel tanks. The conversion was completed and the airplane was certified for return to service on February 5, 1997. The airplane was flown to Huron Park, Ontario, on March 10, 1997, where it was stripped and painted, and affixed with insignia of the Republic of Mali. The Mali registration number, TZ389, was put on the airplane at that time. The airplane had flown approximately 10.0 hours following its return to service when the accident occurred.

The A-36 airplane was owned and operated by Basler Turbo Conversions, Inc., Oshkosh, Wisconsin. The airplane had undergone an annual inspection on June 1, 1996. At the time of the accident, the airframe had 5,776 hours.

METEOROLOGICAL CONDITIONS

At 1445 cst, the Flight Service Station at Green Bay, Wisconsin, put out a weather advisory (AIRMET) calling for light to occasional moderate turbulence below 8,000 feet mean sea level

(MSL).

At 1528 cst, the weather reporting station at Manitowoc, Wisconsin, reported winds aloft at 3,000 feet MSL to be 280- degrees magnetic at 15 knots, gusting to 20 knots.

At 1614 cst, the weather reporting station at Manitowoc, Wisconsin, reported clear skies, 10 miles visibility, temperature 16-degrees Fahrenheit, dew point zero, altimeter setting 30.30, and winds 280-degrees at 15 knots, gusting to 20 knots.

No evidence was found that the pilot of the DC-3C or the pilot of the A-36 obtained a weather briefing prior to departing Oshkosh, Wisconsin.

WRECKAGE AND IMPACT INFORMATION

The NTSB on scene investigation began on March 15, 1997, at 2130 cst.

DC-3C

The DC-3C airplane's main wreckage was resting inverted at the east edge of a small grove of trees, 150 feet south of Newton Road, an east-west running paved road, one-half mile west of the town of Newton, Wisconsin. The fuselage was oriented on a magnetic heading of 180 degrees. There was a ground scar in the wooded area 48 feet aft and right of main wreckage. The ground scar was approximately 9 feet long and 4 feet wide. The airplane's vertical stabilizer rested at the west edge of the ground scar. At the north end of the ground scar, five trees were severed at or near their bases. A debris field 55 feet long and 25 feet wide at its widest point, fanned outward along a 140 degree heading and ended at the empennage area of the main wreckage. Parts of the airplane including interior bulkheads, floor panels, cargo harnesses, lavatory, plexiglass windows, fuselage skin, tree debris, and earth was scattered throughout the debris field. A tree at the south edge of the debris field was severed at the base. Several trees in and around the periphery of the debris field showed trunk and branch damage ranging in height from 15 to 40 feet up from their bases. Trees damaged through the trunks showed shears in the wood of 60 to 70 degrees. Other airplane components, including the left and right outboard wing sections, the left and right wing ailerons, the right elevator, the rudder, and the left main cargo door frame, were located within one-quarter mile of the main wreckage on a 135-degree mean heading.

The DC-3C's main wreckage consisted of the airplane's fuselage, the left and right horizontal stabilizers, the left elevator, the vertical stabilizer, and the center wing section to include both main landing gear, both engines and both propellers. The fuselage from station 372.5 forward to the cockpit and nose area of the airplane rested inverted in a field just south of the tree grove.

The fuselage aft of station 372.5 rested on its right side. The forward fuselage including the nose, cockpit area, and cabin area forward of the leading edge of the center wing section at station 191 was broken open, crushed inward, twisted left and aft. The fuselage over the center wing section was broken open longitudinally along the top of the airplane from station 191 aft to station 372.5. The sides of the fuselage over the center wing section were bent outward, crushed down and aft. The fuselage was broken laterally and separated at station 390.5. The fuselage from the fracture at station 390.5, aft to the empennage and tailcone area was crushed inward, broken open and bent aft. The top of the fuselage from station 390.5 aft to station 465.5 was broken out and crushed inward. The aft fracture on the top of the fuselage at station 465.5 was an 18-inch long lateral tear running at a 10 degree angle from the lateral axis. The

tear ran into the cabin ceiling. Cabin ceiling material and wiring were severed. Metal skin along the tear was jagged. It had been pulled outward, twisted to the right and bent back. Laterally running black marks and scratches were found along the length of the metal tear. The sides of the fuselage between station 390.5 and 465.5 were bent outward and aft. Several small sections of the fuselage skin in this area around the passenger windows were broken out. The fuselage aft of station 465.5 to the tail position light at station 773.5 was twisted right and crushed inward slightly. A lateral fracture was found at station 651 running from the top of the fuselage down through the tailwheel area, and ending at the bottom of the right side. The tailwheel was undamaged. The aft cargo door was broken up and aft at the hinges. It was crushed inward and aft and was found resting just aft of the fuselage. The forward cargo plug door and frame were buckled outward and broken up and aft at the hinges. The plug door frame was located in a wooded area 3,168 feet from the main wreckage on a 135-degree heading. The frame was broken and bent forward 30 degrees at the upper hinge. The plug door was located just south of the wooded area. The plug door was undamaged. The upper latches were in the open position. The "flip-up" upper cargo door was broken laterally at station 465.5.

The forward part of the door was broken off at the hinge line and at the lateral break. Black paint and longitudinally running scratches were noted along the edge of the lateral fracture. The remaining part of the "flip-up" upper cargo door was partially separated along the forward part of the hinge line. The metal at the fracture was bent upward and aft. The top of the aft fuselage at station 465.5 showed a 24-inch long lateral tear running at a 10 degree angle from the hinge line of the upper cargo door across the top of the airplane. The tear ran into the cabin ceiling. Electrical wires and cabin material were severed.

Metal skin along the tear was jagged. It had been pulled outward, twisted to the right and bent back. Laterally running black marks and scratches were found along the entire length of the metal tear. Light yellow paint scratches were found running longitudinally along the top and upper left side of the aft fuselage section beginning just aft of the lateral tear and ending near the vertical stabilizer.

The empennage area of the DC-3C was crushed inward on the left side. Light yellow paint scratches were found running longitudinally on the upper left side of the empennage area. The vertical stabilizer, rudder, right horizontal stabilizer and both elevators had broken off at the roots. The metal on top of the empennage area where the vertical stabilizer had broken off was bent left and aft. The left horizontal stabilizer was bent up and twisted aft, but remained attached to the empennage at the spar. Metal skin aft of the left horizontal stabilizer spar was torn and bent upward and aft. The remaining metal skin and spar where the right horizontal stabilizer attached were bent upward and aft.

The vertical stabilizer of the DC-3C was found 55 feet aft of the fuselage at the west edge of the ground scar at the beginning of the debris field. It had separated from the empennage at the root and was bent to the left and aft. The skin showed buckling across the left side running 60 degrees to the vertical axis beginning at the leading edge and running aft to the rudder hinge line. The spar at the rudder hinge line was twisted left. The lower rudder hinge attachment was broken out aft and up. The upper hinge attachment was intact. The "c" clamp was elongated aft and broken open. The top aft portion of the vertical stabilizer which aligns with the top forward part of the rudder was bent upward and to the left. The metal forming 30 inches of the leading edge of the vertical stabilizer beginning 24 inches down from the top was

pinched together and buckled. The antennae on the upper left side of the vertical stabilizer had been broken off. A 5-inch long, 3-inch wide "v-shaped" puncture in the left side skin of the vertical stabilizer was found 32 inches down from the top and 12 inches aft of the leading edge. Light yellow paint scratches were found around the puncture. Several light yellow paint scratches were observed running along the forward left side of the vertical stabilizer beginning at the base and running upward and forward from the rudder hinge line to the "v- shaped" puncture. The skin of the right side of the vertical stabilizer was buckled vertically across the span of the surface. The rotating beacon at the top of the vertical stabilizer was intact.

The left horizontal stabilizer of the DC-3C remained attached to the empennage at the spar. The leading edge of the horizontal stabilizer was bent upward approximately 70 degrees and twisted aft beginning at the root leading edge and extending outboard 24 inches. The twisting extended aft from the leading edge approximately 12 inches. A 10-inch long, 5-inch wide puncture was observed in the center of the upper skin, 48 inches inboard from the tip. A similar, but smaller puncture was found in the lower skin. Leaves and wood debris was found in the puncture. The lower surface of the left horizontal stabilizer was buckled down and bent aft. A 20-inch long tear in the lower skin was observed running along the center rivet line beginning 24 inches inboard of the tip. A 13-inch long, 8-inch wide tear was found running aft and inboard along the lower leading edge of the stabilizer beginning 24 inches inboard of the tip. The inboard left elevator hinge mount was bent inboard 30-degrees. The end of the hinge was broken aft and inboard. An 1/8-inch metal safety cable remained attached at the hinge base and showed splaying at the end. The outboard left elevator hinge was bent inboard and broken off two inches from the base. An 1/8-inch metal safety cable remained attached at the hinge base and showed splaying at the end. Light yellow paint scratches were observed beginning 48 inches inboard of the tip and three inches aft of the upper surface leading edge and ran laterally to the root. Numerous light yellow paint scratches ran forward and inboard at 10-degree angles from the lateral axis beginning at the leading edge bend and running inboard to the root of the left horizontal stabilizer's upper surface.

The left elevator of the DC-3C had separated from the left horizontal stabilizer at the hinges. It was located immediately aft of the empennage area on the right side of the airplane. The elevator and elevator trim tab were bent down approximately 60- degrees beginning at the inboard edge and extending outboard 50 inches to a longitudinal running rivet line. The upper surface of the left elevator was broken open longitudinally along the rivet line. Two small punctures in the skin were observed just inboard and forward of the trim tab. The lower surface was bent and buckled. Metal around the inboard hinge area at the leading edge of the elevator was crushed down and aft. The remainder of the elevator surface showed skin wrinkling. The inboard hinge was broken out at the attach point. An 1/8-inch metal safety cable remained attached and showed splaying at the end. The outboard hinge remained attached to the elevator. It was bent inward and broken near its base. A puncture in the lower metal skin aft and outboard of the hinge was observed. A 1/8-inch metal safety cable remained attached and showed spaying at the end.

The right horizontal stabilizer of the DC-3C was broken off at the root and located lodged in some small trees approximately 10 feet aft and left of the empennage area of the main wreckage. The metal skin along the root and the spar were bent downward and aft. The stabilizer was bent down 24-degrees and buckled aft, beginning 60 inches outboard of the root and running forward and inboard from the hinge line to the leading edge at a 35- degree angle. A 48-inch buckle ran laterally down the center of the upper surface. The bottom skin along the

leading edge was bent down and aft from mid-span to the root. Metal tears were observed 12 inches, 48 inches and 67 inches outboard of the root along the leading edge. Leaves and wood debris was found in the tears. The inboard and outboard hinges remained attached to the right horizontal stabilizer. The inboard hinge was bent slightly outboard and down. Both hinges were broken off at the ends. The 1/8-inch safety wires at both hinge bases showed splaying at the ends.

The center wing section of the DC-3C was intact and resting inverted on the remains of the center fuselage area. The left wing of the DC-3C had separated three feet outboard of the left engine nacelle at approximately outboard wing station 71.6. The leading edge of the left wing was broken open, bent upward and aft. The upper wing surface metal running aft to the trailing edge was bent up and aft, and buckled outward. Stringers from the upper and lower wing surfaces were bent down approximately 90-degrees and aft. Some stringers were bent forward. The left forward wing spar was bent upward and aft at the point where the wing fractured. The left center wing spar was twisted forward, and bent upward and aft at the point where the wing fractured. The left rear wing spar was buckled forward, and bent aft and slightly up at the point where the wing fractured. The two left outboard wing cylindrical fuel tanks were bent inward and down, and fractured. The smell of fuel was prevalent around the area. The left flap box was intact. The flap surface was bent up slightly at the outboard edge. The upper cowling of the left engine nacelle was broken open. The left engine was intact. The engine mounts were bent down and inboard. The lower cowling of the left engine was broken down just forward of the left main landing gear wheel well. The left main landing gear and tire were undamaged. The left propeller, left engine gear reduction box and left propeller governor had separated from the engine and were resting 50 feet forward and east of the main wreckage. Three of the five propeller blades had broken out of their clamps and were resting beneath and forward of the left engine nacelle. All five blades showed signs of torsional bending, chordwise scratching and tip curling. The spinner was crushed inward.

The right wing of the DC-3C had separated five feet outboard of the right engine nacelle at approximately outboard wing station 107.4. The leading edge of the right wing was bent in and down. The upper wing surface metal running aft to the trailing edge was crushed inward and aft, and buckled open at the point where the wing fracture occurred. Stringers from the inside upper wing surface were twisted aft and bent slightly down. Stringers from the inside lower wing surface were twisted aft and slightly up. The left forward wing spar was bent upward and aft at the point where the wing fractured. The left center wing spar was twisted forward, and bent upward and aft at the point where the wing fractured. The left rear wing spar was buckled forward, and bent aft and slightly up at the point where the wing fractured. The two right outboard wing cylindrical fuel tanks were crushed inward, bent aft, and fractured. The smell of fuel was prevalent in and around the area. The right flap box was broken out and resting just forward of the right engine nacelle. The flap surface was bent downward and buckled at the inboard edge. The upper cowling of the right engine nacelle was broken open. The right engine was intact. The engine mounts were bent down and outboard. The lower cowling of the left engine was broken down just forward of the right main landing gear wheel well. The right main landing gear and tire were undamaged. The right propeller was still attached to the engine. All five blades showed torsional bending, chordwise scratching and tip bending. The spinner was crushed inward.

The right elevator of the DC-3C was located in an open field, 635 feet from the main wreckage on a 161-degree heading. The leading edge of the elevator was crushed downward and aft along

its entire length. The metal around the hinge was torn outward and aft approximately three inches. Both 1/8-inch metal safety cables attached to the hinges showed splaying at the end. Both top and bottom surfaces showed minor skin wrinkling.

The DC-3C's rudder was located beside a north-south running fence line, 1,215 feet from the main wreckage on a 135-degree heading. The rudder was crushed inward and bent to the right along the hinge line beginning at the base of the rudder and proceeding up to the where the upper hinge attached. The upper hinge was broken out. The metal skin where the upper hinge attached to the rudder was torn outward. Several deep dents were observed beginning 12 up from the training edge and running forward along the top edge of the rudder. The forward slope of the rudder near the rudder's top was bent inward longitudinally along the its left side.

The right outboard wing section of the DC-3C was located in an open field just east of Interstate 43, and 1,320 feet from the main wreckage on a 123-degree heading. The wing was resting inverted and was missing the right aileron. The leading edge of the wing section was bent upward and aft. The metal skin along the upper surface was broken open and bent upward, beginning at the point where the wing separated and ran outboard approximately 48 inches. The metal skin along the lower surface was bent downward and twisted forward near the trailing edge at the point where the wing separated. Lower surface metal was bent down and aft near the leading edge at the separation point. The bottom wing skin was buckled and wrinkled across its span and entire length. The upper surface skin was opened up and bent aft across the span at the fracture. The right forward wing spar was buckled aft and bent upward. The right center wing spar was bent upward and buckled forward and aft. The right rear wing spar was bent upward and twisted aft. The wing tip area beginning at the heel of the tip rib at outer wing station 338.2 was bent slightly down longitudinally along the tip rib. Light yellow paint scratches ran across the upper wing tip surface beginning near the trailing edge of the aileron hinge line, 10 inches inboard of the tip rib, and running 45-degrees outboard and forward to the leading edge near the wing tip. The upper wing surface in this area was also crushed downward.

The left wing aileron of the DC-3C was located in an open field 1,100 feet from the main wreckage on a 204-degree heading. The aileron had broken into three pieces. Each piece was within 5 feet of each other. The inboard section was 78 inches in length from the inboard edge to the fracture. It was bent upward and crushed aft along the leading edge. The trailing edge was buckled open and bent forward midway down the section. The inboard hinge attachment was twisted inboard and broken off at the rivets. The second hinge was broken out near the fracture. The metal along the fracture was crushed inward and bent up and aft.

The middle section of the left wing aileron was approximately 115 inches in length from fracture to fracture. The section was crushed inward along the leading edge. The metal at the outboard fracture was bent upward. The number three hinge was broken out at the rivets. The number four hinge, located at the outboard fracture, was attached and twisted 90-degrees outboard.

The outboard section of the left wing aileron was approximately 100 inches long. The metal at the fracture was bent up and outboard approximately three inches to the number five hinge. The hinge was twisted outboard. The upper skin metal was fractured at a 45-degree angle beginning at the number five hinge and running outboard and aft to the trailing edge. The number six hinge was broken out.

The inboard two-thirds of the DC-3C's right wing aileron was located among some brush, resting inverted, 530 feet from the main wreckage on a 127-degree heading. The inboard aileron section was fractured into two pieces. The inboard section was 74 inches long. The leading edge was crushed down and aft near the inboard hinge, and was broken up and aft near the fracture at the number two hinge. The outboard section was crushed in and aft at the inboard fracture. The upper surface was buckled upward 25-degrees at mid-span.

The outboard section of the right wing aileron was located along the west side of Gass Road, a north-south running paved road, 2,695 feet from the main wreckage on a 110-degree heading. The section was 108 inches long. The metal at the fracture was bent up and twisted aft. The upper surface of the outboard aileron section was bent upward slightly at mid-span and buckled aft. The number six hinge was broken out at the rivet attachment.

The left outboard wing section of the DC-3C was located at the eastern edge of a wooded area, 2,112 feet from the main wreckage on a 131-degree heading. The wing was resting upright and was missing the left aileron. The upper wing skin beginning at the inboard fracture was bent up and forward near the leading edge, and up and aft near the trailing edge. The upper wing skin was broken aft along a 45-degree angle from the leading edge outward to the trailing edge. The lower wing skin was bent upward and slightly aft. The left forward wing spar was buckled aft, twisted forward and bent upward at the fracture. The left center wing spar was buckled aft and broken upward at a 40-degree angle.

The left rear wing spar was bent up and aft at the point where it fractured. The wing tip area beginning at the heel of the tip rib at outer wing station 338.2 was bent slightly down longitudinally along the tip rib. The remainder of the outboard wing section showed minor skin wrinkling.

The DC-3C engines, their respective components and the propellers were retained for further testing.

A-36

The A-36's main wreckage was resting inverted in a snow-covered field 1,320 feet east of South Gass Lake Road, a north- south running paved road going through the town of Newton, Wisconsin. The A-36's main wreckage was located 6,336 feet from the main wreckage of the DC-3C on a magnetic heading of 116 degrees.

The first ground scar was located in the snow-covered field 393 feet east of a north-south running fence. The ground scar was approximately 10 inches deep, 12 feet long and 30 feet wide. The ground scar resembled the silhouette of a small straight-winged airplane oriented on a 114-degree magnetic heading. The airplane's VHF antennae rested at the west edge of the ground scar. Pieces of plexiglass and light yellow colored metal from the A-36 airplane were found in and around the east edge of the ground scar. Beginning at the east edge of the ground scar, a spray of earth fanned out approximately 40 degrees southeast of the ground scar for 30 feet. The pilot-side push-out cabin window of the A-36 was found 10 feet from the first ground scar on a 121-degree heading.

The A-36's forward cabin door was located 458 feet from the first ground scar on a 118-degree heading. The cabin door window was broken out and the window frame was twisted in and aft. The main door section was buckled outward.

Small pieces of cabin interior, insulation, plexiglass, charts, flight and navigation instruments,

airplane radios and personal effects were scattered along a 114-degree magnetic heading beginning at the first ground scar and extending 657 feet to the second ground scar.

The second ground scar was 6 feet long, 5 feet wide and 12 inches deep. The A-36's propeller rested on the south east edge of the ground scar. A spray of earth and frozen oil fanned out 60 degrees south along a 114- degree heading for approximately 200 feet. The propeller, flange and spinner remained intact and were partially buried in the snow. The three propeller blades exhibited torsional bending, chordwise scratching and tip curling. Several deep nicks were observed in the leading edges of two of the three propeller blades approximately three inches inboard of the tips. Approximately three inches of the third propeller blade was missing. All three propeller blades showed scratches and gouged metal across the back side of blades approximately 4 to 5 inches inboard of the tips. The flange was broken off at the shaft. The spinner was crushed inward and to one side.

The right front seat of the A-36 was located 860 feet from the first ground scar on a 116-degree heading. The pilot's seat was located 875 feet from the first ground scar on a 119-degree heading. Both seats remained intact and had broken out of the airplane at the floor rails.

The A-36's main wreckage consisted of the fuselage, left and right wings, left horizontal stabilizer and the lower one-third of the rudder. It was located 894 feet from the first ground scar on a 114-degree magnetic heading. The A-36's engine defined the eastern edge of the accident site. It was located 955 feet from the first ground scar on a 115-degree magnetic heading.

The engine cowling of the A-36 was broken off at the firewall. The left upper cowling door was broken off from the rest of the cowling at the longitudinal hinges. It was crushed inward and aft. The lower left side of the engine cowling to include the forward landing gear and left nose gear door was broken at the lateral firewall rivet line and bent aft. The forward landing gear and nose wheel tire were undamaged and extended approximately 30 degrees. The lower right side of the engine cowling and right nose gear door were broken along the lateral firewall rivet line, bent to the right and crushed aft.

The top of the A-36 fuselage, from the windscreen area rearward to the aft bulkhead behind the rear passenger seat, was broken off, crushed inward, and bent aft and to the right. The forward fuselage which made up the cabin walls was bent outward on the left side and bent inward on the right side from the windscreen area rearward to the aft bulkhead. All five seats were broken out from the floor of the airplane. The instrument panel was bent inward and broken open. The windscreen and all of the windows were broken out and shattered. The right side cargo doors were broken out of the fuselage at the hinges. They were buckled outward and aft, and the window frames were broken off. The step at the base of the cargo doors on the right side of the fuselage was broken off. Blue-green paint scratches were observed running longitudinally along the right bottom edge of the fuselage in the area of the step. The strobe light housing on the right bottom side of the fuselage near the trailing edge of the right wing was bent inward and showed laterally running scratches in the metal.

The aft portion of the A-36 fuselage from the aft bulkhead to the empennage had broken off and was twisted to the left. It was crushed inward and bent left along the top. The aft fuselage section showed skin buckling throughout.

The A-36's vertical stabilizer was broken off at the root along the longitudinal rivet line. The fin leading to the vertical stabilizer was crushed inward and bent to the left. Parallel- running,

blue-green scratches were observed along the length of the vertical fin running left to right at 40 degree angles.

The rudder had broken off at the hinges and was broken into two pieces. The lower portion of the rudder was approximately 18 inches in length and remained attached to the airplane by the rudder cables.

The left horizontal stabilizer of the A-36 was broken off at the root of the empennage. The inboard 18 inches of the left horizontal stabilizer's leading edge was crushed inward, up and aft. The left elevator had broken off at the hinges and was broken into three pieces. A 16-inch portion of the left elevator, outboard of the left trim tab remained attached to the center hinge of the left horizontal stabilizer. It was bent downward. The remaining portions of the left elevator were broken outboard of the right trim tab. The outboard section was bent upward and broken open. The inboard section of the left elevator and the trim tab were bent upward.

The left wing of the A-36 remained attached to the fuselage. It was crushed aft and upward from mid-span outboard to the tip along the leading edge, and bent aft approximately 15 degrees. The outboard wing section was bent down 20 degrees longitudinally at mid-span. The inboard section of the left wing was crushed inward and down from the root to mid span. The fuel tank was broken open. The smell of fuel was prevalent in the area. The top and bottom surfaces showed outward bending and skin wrinkling running laterally along the entire length of the wing. The left flap was intact and showed upward bending and wrinkling. The left aileron remained attached to the wing. It was buckled upward and bent aft.

The right wing of the A-36 remained attached to the fuselage. It was broken at mid-span longitudinally. The outboard wing section was twisted around 180 degrees so that the upper wing surface was seen. It remained attached to the inboard wing section by the flight control cables. The outboard wing section was crushed aft and upward from mid-span outboard through the wing tip along the leading edge, and bent aft approximately 37 degrees. The right aileron remained attached to the wing. It was buckled upward and bent aft. The right wing tip showed longitudinal blue-green scratches along the entire width of the wing tip's top edge. The inboard section of the right wing was crushed inward and down from the root to the mid-span fracture. The upper wing skin was buckled outward and broken open along the top forward lateral rivet line. The fuel tank was broken open. The smell of fuel was prevalent in the area. The bottom skin surface showed outward bending and skin wrinkling running laterally along the entire length of the wing section. The right flap was intact. The outboard 26 inches of the right flap showed upward bending and wrinkling. The remainder of the flap showed outward buckling.

The right side upper cowling door of the A-36 was located 3,430 feet from the A-36's main wreckage on a 175-degree heading. It was broken along the longitudinal rivet line and flattened out.

The right horizontal stabilizer and right elevator of the A-36 were located 3,590 feet from the A-36's main wreckage on a 194- degree heading. The horizontal stabilizer spar was broken at fuselage station zero. The stabilizer skin surfaces were broken out along the longitudinal rivet lines. The leading edge of the right horizontal stabilizer from the tip inboard to mid-span was pinched together. Several bends and scratches were observed along the upper leading edge. The spar was bent upward 40 degrees approximately 26 inches outboard of the root. The remainder of the upper surface was buckled upward and twisted aft. The outboard section of

the right elevator remained attached to the right horizontal stabilizer. The elevator was broken longitudinally at mid-span. The upper skin of the outboard elevator section was bent up and opened outboard. The remainder of the outboard elevator section was undamaged. The inboard section of the right elevator and right elevator trim tab were never recovered.

The tail cone of the A-36 was located 4,910 feet from the A-36's main wreckage on a 208-degree heading. It had broken off at the lateral rivet line, and was undamaged.

The A-36's vertical stabilizer was located 4,013 feet from the A- 36's main wreckage on a 183-degree heading. It was intact and showed minor damage. The skin along the base of the vertical stabilizer was broken aft at the rivets. The fin attachment at the leading edge base of the vertical stabilizer was broken off. A 4-inch long dent in the leading edge of the vertical stabilizer was observed approximately 8 inches down from the base of the rotating beacon. Several blue-green scratches were observed along the dent running parallel to the leading edge of the vertical stabilizer.

The A-36 engine and its components, and the propeller were retained for further testing.

MEDICAL AND PATHOLOGICAL INFORMATION

The autopsy of the pilot of the DC-3C was performed on March 17, 1997, at the Milwaukee County Medical Examiner's Office, Milwaukee, Wisconsin. The autopsy revealed no evidence of physical incapacitation or impairment. The results of FAA toxicology testing of specimens from the DC-3C pilot were negative for all tests conducted.

The autopsy of the copilot of the DC-3C was performed on March 17, 1997, at the Milwaukee County Medical Examiner's Office, Milwaukee, Wisconsin. The autopsy revealed no evidence of physical incapacitation or impairment.

The results of FAA toxicology testing of specimens from the DC-3C copilot revealed the following volatile concentrations: 0.127 (ug/ml, up/g) Amitriptyline detected in blood 0.039 (ug/ml, up/g) Nortriptyline detected in blood 0.714 (ug/ml, up/g) Amitriptyline detected in liver fluid 1.019 (ug/ml, up/g) Nortriptyline detected in liver fluid Amitriptyline was detected in kidney fluid Nortriptyline was detected in kidney fluid Ephedrine was detected in blood Phenylpropanolamine was detected in blood Ephedrine was detected in liver fluid Phenylpropanolamine was detected in liver fluid Ephedrine was detected in kidney fluid Phenylpropanolamine was detected in kidney fluid

The Head of the FAA Toxicology and Accident Research Laboratory stated that Amitriptyline is a prescribed anti-depressant and sleep-inducing agent. A physician would have to prescribe Amitriptyline. In most cases where Amitriptyline is prescribed, the instructions usually call for taking it prior to bedtime, and not to operate any vehicles.

A Medical Officer from the National Transportation Safety Board's Office of Research and Engineering stated the levels of Amitriptyline found in the copilot's blood, liver and kidney fluids were consistent with the regular use of the medication at doses generally used to control depression. The presence of Nortriptyline in the copilot's blood, liver and kidney fluids were a result of the body's metabolic processing of the Amitriptyline. Evidence of Ephedrine and Phenylpropanoline found in the copilot's blood, liver and kidney fluids were most likely a result of the copilot taking over-the-counter decongestants or diet pills.

The autopsy of the pilot of the A-36 was performed on March 17, 1997, at the Milwaukee County Medical Examiner's Office, Milwaukee, Wisconsin. The autopsy revealed no evidence

of pre- existing physical incapacitation or impairment. The results of FAA toxicology testing of specimens from the A-36 pilot were negative for all tests conducted.

TESTS AND RESEARCH

The DC-3C engines and their respective components were examined at United Technologies Pratt and Whitney Canada, Incorporated, Montreal, Canada, on April 22 and 23, 1997. No anomalies were revealed with either engine or their components.

The DC-3C propellers were examined at Aircraft Propeller Service, Incorporated, Wheeling, Illinois, on July 8, 1997. No anomalies were revealed with either propeller.

The A-36 engine was examined at Teledyne Continental Motors, Mobile, Alabama, on June 3, 1997. No anomalies were revealed with the engine.

The A-36 propeller was examined at Aircraft Propeller Service, Incorporated, Wheeling, Illinois, on July 8, 1997. No anomalies were revealed with the propeller.

ADDITIONAL INFORMATION

Parties to the investigation were the Federal Aviation Administration Flight Standards District Office, Milwaukee, Wisconsin; Basler Turbo Conversions, Incorporated, Oshkosh, Wisconsin; Raytheon-Beech Aircraft Company, Wichita, Kansas; United Technologies Pratt and Whitney Canada, Incorporated; and Teledyne Continental Motors, Mobile, Alabama.

The DC-3C wreckage and the A-36 wreckage were released and returned to American Eagle Group, Incorporated.

## Pilot Information

| | | | |
|---|---|---|---|
| **Certificate:** | Airline Transport | **Age:** | 42, Male |
| **Airplane Rating(s):** | Multi-engine Land; Single-engine Land | **Seat Occupied:** | Left |
| **Other Aircraft Rating(s):** | None | **Restraint Used:** | Seatbelt |
| **Instrument Rating(s):** | Airplane | **Second Pilot Present:** | Yes |
| **Instructor Rating(s):** | Airplane Multi-engine; Airplane Single-engine | **Toxicology Performed:** | Yes |
| **Medical Certification:** | Class 1 Valid Medical--no waivers/lim. | **Last FAA Medical Exam:** | 05/01/1996 |
| **Occupational Pilot:** | | **Last Flight Review or Equivalent:** | |
| **Flight Time:** | 5350 hours (Total, all aircraft), 3775 hours (Total, this make and model), 4425 hours (Pilot In Command, all aircraft), 93 hours (Last 90 days, all aircraft), 25 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft) | | |

## Aircraft and Owner/Operator Information

| | | | |
|---|---|---|---|
| **Aircraft Make:** | Douglas | **Registration:** | TZ389 |
| **Model/Series:** | DC-3C/BT-67R DC-3C/BT-6 | **Aircraft Category:** | Airplane |
| **Year of Manufacture:** | | **Amateur Built:** | No |
| **Airworthiness Certificate:** | Normal | **Serial Number:** | 26002 |
| **Landing Gear Type:** | Retractable - Tailwheel | **Seats:** | 2 |
| **Date/Type of Last Inspection:** | 02/05/1997, Annual | **Certified Max Gross Wt.:** | 30400 lbs |
| **Time Since Last Inspection:** | 10 Hours | **Engines:** | 2 Turbo Prop |
| **Airframe Total Time:** | 17616 Hours | **Engine Manufacturer:** | P&W |
| **ELT:** | Installed, activated, did not aid in locating accident | **Engine Model/Series:** | PT-6A-67R |
| **Registered Owner:** | BASLER TURBO CONVERSIONS, INC | **Rated Power:** | 1754 hp |
| **Operator:** | BASLER TURBO CONVERSIONS, INC | **Operating Certificate(s) Held:** | None |

## Meteorological Information and Flight Plan

| | | | |
|---|---|---|---|
| **Conditions at Accident Site:** | Visual Conditions | **Condition of Light:** | Day |
| **Observation Facility, Elevation:** | MTW, 651 ft msl | **Distance from Accident Site:** | 7 Nautical Miles |
| **Observation Time:** | 1614 EST | **Direction from Accident Site:** | 20° |
| **Lowest Cloud Condition:** | Clear / 0 ft agl | **Visibility** | 10 Miles |
| **Lowest Ceiling:** | None / 0 ft agl | **Visibility (RVR):** | 0 ft |
| **Wind Speed/Gusts:** | 15 knots / 20 knots | **Turbulence Type Forecast/Actual:** | / |
| **Wind Direction:** | 280° | **Turbulence Severity Forecast/Actual:** | / |
| **Altimeter Setting:** | 30 inches Hg | **Temperature/Dew Point:** | 16°C / 0°C |
| **Precipitation and Obscuration:** | | | |
| **Departure Point:** | OSHKOSH, WI (OSH) | **Type of Flight Plan Filed:** | None |
| **Destination:** | | **Type of Clearance:** | None |
| **Departure Time:** | 1400 EST | **Type of Airspace:** | Class E |

## Wreckage and Impact Information

| | | | |
|---|---|---|---|
| **Crew Injuries:** | 2 Fatal | **Aircraft Damage:** | Destroyed |
| **Passenger Injuries:** | N/A | **Aircraft Fire:** | None |
| **Ground Injuries:** | N/A | **Aircraft Explosion:** | None |
| **Total Injuries:** | 2 Fatal | **Latitude, Longitude:** | |

## Administrative Information

| | | | |
|---|---|---|---|
| **Investigator In Charge (IIC):** | DAVID C BOWLING | **Report Date:** | 12/15/1997 |
| **Additional Participating Persons:** | CHUCK EBERT; MILWAUKEE, WI<br>RANDY MYERS; OSHKOSH, WI<br>CARL MASON; OSHKOSH, WI<br>EDDIE E WEBBER; WICHITA, KS | | |
| **Publish Date:** | | | |
| **Investigation Docket:** | NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at pubinq@ntsb.gov, or at 800-877-6799. Dockets released after this date are available at http://dms.ntsb.gov/pubdms/. | | |